INVESTIGATOR'S ANNUAL REPORT

National Park Service

All or some of the information provided may be available to the public

Reporting Year: 1994	**Park:** Shenandoah NP
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No co-investigators

Permit#:
SHEN1994AJLJ

Park-assigned Study Id. #:
unknown

Project Title:
Genetic Variation and Pollen-mediated Gene Dispersal in Poke Milkweed, Asclepias exaltata

Permit Start Date: Jan 01, 1998	**Permit Expiration Date** Jan 01, 1998
Study Start Date: Jan 01, 1993	**Study End Date** Jan 01, 1995

Study Status:
Completed

Activity Type:
Other

Subject/Discipline:
Land Use / Forestry

Objectives:

1. To examine the mating system of Asclepias exaltata, Asclepias syriaca, and hybrid plants in areas of sympatry.;2. To compare levels of self-pollination and long-distance pollen dispersal in these milkweeds with different population structure.

Findings and Status:

The focus of this investigation was to examine the mating system dynamics in hybridizing populations of Asclepias exaltata (poke milkweed) and Asclepias syriaca (common milkweed). The abundance of road-cuts, meadows, and woodlands provide an optimal ecotone for thes two milkweeds to meet and mate in Shenandoah National Park. We investigated the potential for hybridization by analyzing (1) pollinia (milkweed pollen disperal units) carried by differnet pollinators, (2) pollinia inserted into stigmatic chambers, (3) seeds collected from each milkweed species,and (4) mating patterns in hybrid populations. Asclepias exaltata and A. syriaca differ in several alleles at diagnostic isozyme loci. This permits us to identify the pollen of each species and the production of hybrid seeds.;The survey of pollinators revealed that both species are serviced and effectively pollinated by similar insect fauna. Among the most effective pollinators were the gold-banded skipper, cabbage butterfly, European honey bee, and several unidentified species of bumble bee. Large butterflies (i.e., monarch, fritillary, and swallowtail butterflies) were frequently observed on milkweed flowers, but are very poor pollinators of the milkweeds. We were surprised to learn that individual pollinators tend to specialize on just one milkweed species. Our electrophoretic analysis of pollinia on insects supports this observation. Only 20% of the pollinia collected from pollinators of A. exaltata were carrying pollen A. syriaca.;Furthermore, only 4% of the pollinia collected from pollinators of A. syriaca were carrying pollen of A. exaltata. The insects most likely to effectively cross-pollinate A. exaltata and A. syriaca were cabbage butterflies and gold-banded skippers. Honey bees and bumble bees showed the greatest fidelity to a milkweed species.;The percentage of interspecific pollinations was lower than expected. Only 3.1% and 2.2% of the effective pollinations of A. exaltata and A. syriaca, respectively, were between the species. Similarly, effective hybridization was low. No hybrids were detected among 648 seeds collected form 108 fruits of A. syriaca. Only 2.1% of the 564 seeds collected from 94% of A. exaltata were hybrids. This result is surprising. Cross-pollination by hand demonstrated that hybrid seed is 12 X more likely when A. exaltata is the pollen parent rather than the maternal parent.;Results of pollination experiments and the location of hybrid populations indicates that hybridization is asymetrical with A. syriaca as the maternal parent. We identified populations hybrid milkweeds at Big Meadows, Spitler Knoll overlook, and along a stretch of Skyline Drive between mile markers 53 and 54. In all hybrid populations, F1 hybrids and backcrosses with A. syriaca were found embedded in pure populations of A. syriaca. Crossing experiments reveal that F1 hybrids are equally likely to mate with either A. exaltata or A. syriaca. Nevertheless, the probability of F1 hybrids

mating with A. exaltata are remote because of the location of hybrid populations in pure populations of A. syriaca.

For this study, were one or more specimens collected and removed from the park but not destroyed during analyses?

No

Funding provided this reporting year by NPS:	**Funding provided this reporting year by other sources:**
0	8000

Fill out the following ONLY IF the National Park Service supported this project in this reporting year by providing money to a university or college

Full name of college or university:	**Annual funding provided by NPS to university or college this reporting year:**
n/a	0